WHAT IS CLAIMED IS:

1. In a system for processing a workpiece by applying controlled heat thereto, an apparatus comprising:

a heating arrangement defining a heating plane for use in a confronting relationship with said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement;

a segmented radiation shield including a plurality of segments supported for movement at least partially through said heating plane between (i) retracted positions, in which said direct radiation is allowed to reach said workpiece and (ii) extended positions, in which the plurality of segments cooperate in way which serves to at least partially block said direct radiation from reaching the workpiece; and

means for moving the plurality of segments between the retracted positions and the extended positions.

2. The apparatus of claim 1 wherein said heating arrangement includes an array of heating elements and wherein at least certain ones of said segments move between adjacent ones of the heating elements in moving between said retracted positions and said extended positions.

3. The apparatus of claim 2 wherein each of said heating elements defines a heating axis, such that the heating axes of all of the heating elements are in a side-by-side relationship and each of said segments is an elongated shutter member defining a shutter elongation dimension such that the elongation dimensions of the elongated shutter members are at least aligned with one another.

4. The apparatus of claim 3 wherein said heating axis of the heating elements and the shutter elongation dimension of said elongated shutters are spaced apart in an at least generally side-by-side aligned relationship.

5. The apparatus of claim 3 wherein said workpiece includes a major surface to be exposed to the heating arrangement and the shutter elongation dimension is at least generally aligned in a side-by-side spaced apart relationship with the major surface of the workpiece.

6. The apparatus of claim 3 wherein said workpiece includes a major surface to be exposed to the heating arrangement and the shutter elongation dimension is at least generally transverse to the major surface of the workpiece.

7. The apparatus of claim 3 wherein the elongated shutter members are configured such that at least one elongated shutter member moves at least partially through the heating plane between adjacent ones of the heating elements while moving between the retracted position and the extended position for that shutter member.

8. The apparatus of claim 3 including a support arrangement which supports said heating elements and which defines a surface facing the heating arrangement, said support arrangement further defining a plurality of elongated shutter slots each of which includes a shutter opening, defined in said surface, such that each of said slots is configured for at least partially receiving one of the elongated shutter members in said retracted position.

9. The apparatus of claim 8 wherein said support arrangement includes a thickness that is normal to said surface and defines through said thickness a plurality of through holes, each of which includes an aperture formed in said surface for use in gas cooling at least said heating elements.

10. The apparatus of claim 8 wherein said support arrangement includes a thickness that is normal to said surface and defines within said thickness at least one cooling channel for containing a cooling fluid within the cooling channel.

11. The apparatus of claim 8 wherein each of said elongated shutter members includes a pair of opposing ends defining an elongation length therebetween and each opposing end is supported by a hinge arrangement including a hinging arm that is hingably connected with said support arrangement such that each elongated shutter member moves rotatably between its retracted position and its extended position.

12. The apparatus of claim 5 wherein each elongated shutter member, in the extended position, is locatable, at least in part, between the heating plane and the workpiece to cooperate with other ones of the shutter members for blocking said direct radiation.

13. The apparatus of claim 3 wherein each elongated shutter member is arcuate in cross-section in a plane that is transverse to an elongated dimension of each elongated shutter member.

14. The apparatus of claim 13 wherein each elongated shutter member includes a leading edge and a trailing edge and the leading edge of a particular elongated shutter member is proximate to an adjacent one of the elongated shutter members in said extended positions along a line of proximity that is between the leading edge and the trailing edge of the adjacent elongated shutter member.

15. The apparatus of claim 14 wherein the line of proximity is adjacent to the trailing edge of the adjacent shutter.

16. The apparatus of claim 3 wherein each elongated shutter member includes a leading edge and a trailing edge such that the leading edge confronts the heating arrangement at least with the shutter in said retracted position and said leading edge of at least one shutter includes a reflective coloration.

17. The apparatus of claim 3 wherein each elongated shutter member includes an inner surface which confronts said heating elements in said extended positions and said inner surface of at least one shutter supports a reflective material.

18. The apparatus of claim 3 wherein each elongated shutter member includes an outer surface which confronts said workpiece in said extended position and said outer surface of at least one shutter includes a radiation absorbing coloration.

19. The apparatus of claim 3 wherein said elongated shutter members rotate at least partially around respective ones of the elongated heating elements in moving between the retracted positions and the extended positions.

20. The apparatus of claim 3 wherein successive ones of said elongated shutter members move between alternate adjacent ones of the elongated heating elements.

21. The apparatus of claim 3 wherein each of said elongated shutter members is formed as a generally rectangular planar plate having a pair of opposing major surfaces with a thickness therebetween and having a pair of opposing ends defining said shutter elongation dimension therebetween and said moving means includes a pair of control arms, one pair of which is positioned at each opposing end of each elongated shutter member, and each of which control arms includes a control arm end that is pivotally attached to one of the elongated shutter members such that a controlled movement of each pair of control arms causes a pivotally attached one of the elongated shutter members to pivotally rotate with respect to that pair of control arms(don't they rotate with the control arms?, in moving between said retracted position and said extended position.

22. The apparatus of claim 1 wherein said moving means is configured for moving all of said segments in unison between said retracted positions and said extended positions.

23. The apparatus of claim 1 wherein said heating arrangement includes an array of heating elements in a side-by-side relationship and wherein each of said segments move along an extension direction from a retracted position through said array of heating elements when moving from said retracted positions to said extended positions.

24. The apparatus of claim 23 wherein said extension direction is at least generally toward said workpiece from the retracted positions and each of said segments is a shutter member that is configured for extension toward said workpiece from said retracted position.

25. The apparatus of claim 24 wherein each of said shutter members is formed as an at least generally planar plate defining a major plane and said extension direction is at least generally aligned with said major plane and toward said workpiece.

26. The apparatus of claim 24 wherein each of said shutter members is formed having a tubular configuration defining a shutter interior such that at least one of said heating elements is at least partially received within said shutter interior of each shutter member as each shutter member moves from said retracted position to said extended position.

27. The apparatus of claim 26 wherein at least one of said shutter members is received within the shutter interior of another one of said shutter members.

28. The apparatus of claim 26 wherein said tubular configuration is cylindrical.

29. The apparatus of claim 23 wherein said heating elements are arranged in a series of concentric rings and said shutters are arranged concentrically such that from a center point of the array each successive one of the tubular shutters, outward from the center point, moves around a greater number of said concentric rings.

30. The apparatus of claim 1 wherein said moving means includes means for providing a controlled acceleration and deceleration of the segments moving between the retracted positions and the extended positions.

31. The apparatus of claim 3 wherein each shutter member defines a shutter plane and said movement means extends and retracts each shutter using linear movements toward and away, respectively, from the heating arrangement such that each shutter moves in its shutter plane.

32. The apparatus of claim 31 wherein each shutter defines a pair of opposing major surfaces and wherein at least one shutter includes a radiation absorbing coloration on both of said opposing major surfaces.

33. The apparatus of claim 31 wherein each shutter member includes a pair of elongated first and second opposing major edges and said first elongated major edge is captured by a support plate and said movement means moves the shutter members in unison by linearly moving said support plate toward and away from the heating arrangement.

34. The apparatus of claim 33 wherein said second, opposing major edge of at least one shutter moves through said heating plane when the shutter is moved between the retracted position and the extended position.

35. The apparatus of claim 34 wherein said second opposing edge of at least one shutter includes a radiation reflecting coloration.

36. The apparatus of claim 31 wherein said shutter arrangement includes a reflector plate confronting said heating arrangement on a side thereof which is opposite of said workpiece and defining a plurality of elongated shutter slots in said reflector plate such that each shutter moves in one shutter slot during extension and retraction thereof.

37. The apparatus of claim 36 wherein each shutter defines an overall exterior surface area and at least a selected one of said slots defines an interior periphery and wherein said reflector plate defines a plurality of bearing members in said selected slot for contacting a portion of said overall exterior surface area such that the overall exterior surface of the shutter, away from said bearing members, is spaced apart from the interior periphery of the slot in which it is received by approximately said bearing member thickness.

38. The apparatus of claim 37 wherein said shutter is spaced apart from the slot so as to define a plurality of cooling channels through which a cooling gas can flow to provide cooling at least for the selected shutter.

39. In a system for processing a workpiece by applying controlled heat thereto, a method comprising the steps of:

providing a heating arrangement defining a heating plane for use in a confronting relationship with said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement; and

configuring a segmented radiation shield to include a plurality of segments supported for movement between (i) retracted positions, in which said direct radiation is allowed to reach said workpiece, and (ii) extended positions, in which the plurality of segments cooperate in way which serves to at least partially block said direct radiation from reaching the workpiece.

40. The method of claim 39 wherein said heating arrangement is provided including an array of heating elements such that certain ones of said segments move between adjacent ones of the heating elements in moving between said retracted positions and said extended positions.

41. The method of claim 40 wherein each of said heating elements is elongated in length, defining a heating axis, such that the heating axes of the heating elements are in a side-by-side relationship and each of said segments is

provided as an elongated shutter member defining a shutter elongation dimension and including arranging the elongation dimension of the elongated shutter members at least generally aligned with one another.

42. The method of claim 41 including arranging the heat element axis of the heating elements and the shutter elongation dimension of said elongated shutters in a spaced-apart at least generally side-by-side aligned relationship.

43. The method of claim 42 wherein said workpiece includes a major surface to be exposed to the heating arrangement and including arranging the shutter elongation dimension at least generally aligned in a side-by-side spaced apart relationship with the major surface of the workpiece.

44. The method of claim 42 wherein said workpiece includes a major surface to be exposed to the heating arrangement and including arranging the heating axis of the heating elements and the shutter elongation dimension at least generally transverse to the major surface of the workpiece.

45. The method of claim 41 wherein the elongated shutter members are configured such that each elongated shutter member moves at least partially through the heating plane between adjacent ones of the heating elements while moving between the retracted position and the extended position for that shutter member.

46. The method of claim 41 including the step of forming a support arrangement for supporting said heating elements having a surface facing the heating arrangement, said support arrangement further formed to define a plurality of elongated shutter slots each of which includes a shutter opening, defined in said surface, such that each of said slots is configured for at least partially receiving one of the elongated shutter members in said retracted position.

47. The method of claim 46 wherein said support arrangement is formed to include a thickness that is normal to said surface and to define, through said thickness, a plurality of through holes, each of which includes an aperture formed in said surface for use in gas cooling said heating elements.

48. The method of claim 46 wherein said support arrangement is formed to include a thickness that is normal to said surface and to define, within said thickness, at least one cooling channel for containing a cooling fluid within the cooling channel.

49. The method of claim 46 wherein each of said elongated shutter members is configured to include a pair of opposing ends defining an elongation length therebetween and including the step of supporting each opposing end using a hinge arrangement including a hinging arm that is hingably connected with said support arrangement such that each elongated shutter member moves rotatably between its retracted position and its extended position.

50. The method of claim 31 wherein each elongated shutter member, in the extended position, is locatable, at least in part, between the heating plane and the workpiece to cooperate with other ones of the shutter members for blocking said direct radiation.

51. The method of claim 41 wherein each elongated shutter member is configured as arcuate in cross-section in a plane that is transverse to an elongated dimension of each elongated shutter member.

52. The method of claim 51 wherein each elongated shutter member is further configured to include a leading edge and a trailing edge, and the leading edge of a particular elongated shutter member is proximate to an adjacent one of the elongated shutter members in said extended positions along a line of proximity that is between the leading edge and the trailing edge of the adjacent elongated shutter member.

53. The method of claim 52 wherein the line of proximity is adjacent to the trailing edge of the adjacent shutter.

54. The method of claim 41 wherein each elongated shutter member is configured to include a leading edge and a trailing edge such that the leading edge confronts the heating arrangement at least with the shutter in said retracted position and including the step of forming said leading edge to include a reflective coloration.

55. The method of claim 41 wherein each elongated shutter member is formed having an inner surface which confronts said heating elements in said extended positions and including the step of supporting a reflective material on said inner surface of at least one shutter.

56. The method of claim 41 wherein each elongated shutter member includes an outer surface which confronts said workpiece in said extended position and said outer surface of at least one shutter includes a radiation absorbing coloration.

57. The method of claim 41 wherein said elongated shutter members are supported for rotating at least partially around respective ones of the elongated heating elements in moving between the retracted positions and the extended positions.

58. The method of claim 41 including the step of arranging successive ones of said elongated shutter members to move between alternate adjacent ones of the elongated heating elements.

59. The method of claim 41 including the step of forming each of said elongated shutter members as a generally rectangular planar plate having a pair of opposing major surfaces with a thickness therebetween and having a pair of opposing ends defining said shutter elongation dimension therebetween and including the step of configuring moving means to include a pair of control arms, one pair of which is positioned at each opposing end of each elongated shutter member, and each of which control arms includes a control arm end that is pivotally attached to one of the elongated shutter members such that a controlled movement of each pair of control arms causes a pivotally attached one of the elongated shutter members to pivotally rotate, with respect to that pair of control arms, in moving between said retracted position and said extended position.

60. The method of claim 39 wherein said moving means is configured for moving all of said segments in unison between said retracted positions and said extended positions.

61. The method of claim 39 wherein said heating arrangement is provided including an array of heating elements in a side-by-side relationship and moving each of said segments along an extension direction from a retracted position through said array of heating elements when moving from said retracted positions to said extended positions.

62. The method of claim 61 wherein said extension direction is at least generally toward said workpiece from the retracted positions and configuring each of said segments as a shutter member for extension toward said workpiece from said retracted position.

63. The method of claim 62 wherein each of said shutter members is formed as an at least generally planar plate defining a major plane and said extension direction is at least generally aligned with said major plane and toward said workpiece.

64. The method of claim 62 including forming each of said shutter members having a tubular configuration defining a shutter interior such that one of said heating elements is at least partially received within said shutter interior of each shutter member as each shutter member moves from said retracted position to said extended position.

65. The method of claim 64 wherein at least one of said shutter members is received within the shutter interior of another one of said shutter members.

66. The method of claim 64 wherein said tubular configuration is cylindrical.

67. The method of claim 39 wherein said moving means is configured for providing a controlled acceleration and deceleration of the segments moving between the retracted positions and the extended positions.

68. The method of claim 62 including arranging said heating elements in a series of concentric rings and configuring said shutter members concentrically in a tubular configuration such that from a center point of the array each successive one of the shutter members, outward from the center point, moves around a greater number of said concentric rings.

69. The method of claim 41 wherein each shutter member defines a shutter plane and said movement means is configured to extend and retract each shutter using linear movements toward and away, respectively, from the heating arrangement such that each shutter moves in its shutter plane.

70. The method of claim 69 wherein each shutter defines a pair of opposing major surfaces and including providing a radiation absorbing coloration on both of said opposing major surfaces of at least one shutter.

71. The method of claim 41 including arranging a reflector plate confronting said heating arrangement on a side thereof which is opposite of said workpiece and defining a plurality of elongated shutter slots in the reflector plate such that each shutter moves in one shutter slot during extension and retraction thereof.

72. The method of claim 71 wherein each shutter defines an overall exterior surface area and said method includes forming at least a selected one of said slots to define an interior periphery and further forming said reflector plate to define a plurality of bearing members in said selected slot for contacting a portion of said overall exterior surface area such that the overall exterior surface of the shutter, away from said bearing members, is spaced apart from the interior periphery of the selected slot in which it is received by approximately said bearing member thickness.

73. The method of claim 72 wherein said shutter is spaced apart from the slot so as to define a plurality of cooling channels through which a cooling gas can flow to provide cooling at least for the selected shutter.

74. In a system for processing a workpiece by applying controlled heat thereto, an apparatus comprising:

a plurality of elongated heating elements for subjecting the workpiece to a radiation that is produced by the heating elements;

a support arrangement defining at least one surface for supporting said heating elements side-by-side in a confronting relationship with said workpiece;

a plurality of elongated shutter members at least generally aligned with said elongated heating elements, and movable between a retracted position in which the shutter members allow said radiation to impinge directly upon said workpiece from the heating elements and an extended position such that the shutter members move outward from said surface, beginning from said retracted position, to be interposed at least between selected adjacent ones of the heating elements, in said extended position, in a way which serves to at least partially prevent said radiation from directly reaching said workpiece; and

means for supporting and moving said elongated shutter members between said retracted positions and said extended positions.

75. The apparatus of claim 74 wherein said shutter members further are interposed between the workpiece and the heating arrangement in the extended position.

76. In a system for processing a workpiece by applying controlled heat thereto, a method comprising the steps of:

providing a plurality of elongated heating elements for use in subjecting the workpiece to a radiation that is produced by the heating elements;

forming a support arrangement defining at least one surface for supporting said plurality of elongated heating elements adjacent to one another in a side-by-side relationship in a confronting relationship with said workpiece; and

supporting a plurality of elongated shutter members, at least generally aligned with said elongated heating elements, and movable between a retracted position in which the shutter members allow said radiation to impinge directly upon said workpiece from the heating elements and an extended position such that the shutter members move outward from said surface, beginning from said retracted position, to be interposed between the heating elements and the workpiece, in said extended position, in a way which serves to at least partially prevent said radiation from directly reaching said workpiece.

77. The method of claim 76 wherein said shutter members further are interposed between the workpiece and the heating arrangement in the extended position.

78. In a system for processing a workpiece by applying controlled heat thereto, an apparatus comprising:

a heating arrangement for use in a confronting relationship with said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement;

a radiation shield supported for pivotal movement between (i) a retracted position, at least partially on a side of said heating arrangement that is opposite from said workpiece to allow said direct radiation to reach the workpiece, and

(ii) an extended position, between the heating arrangement and said workpiece, in which extended position the radiation shield serves to at least partially block said direct radiation from reaching the workpiece.

79. In a system for processing a workpiece by applying controlled heat thereto, a method comprising the steps of:

providing a heating arrangement for use in a confronting relationship with said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement; and

supporting a radiation shield for selective pivotal movement between (i) a retracted position, at least partially on a side of said heating arrangement that is opposite from said workpiece to allow said direct radiation to reach the workpiece, and (ii) an extended position, between the heating arrangement and said workpiece, in which extended position the radiation shield serves to at least partially block said direct radiation from reaching the workpiece.

80. In a system for processing a workpiece by applying a controlled heat thereto, an apparatus comprising:

a heating arrangement including an array of spaced apart heating elements for use in a confronting relationship with said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement; and

a segmented radiation shield including a plurality of segments supported for movement between (i) retracted positions, which allow said direct radiation to reach the workpiece, and (ii) extended positions, in which extended positions the plurality of segments cooperate in way which serves to block, at least in part, said direct radiation from reaching the workpiece and configured for moving at least certain ones of said segments of the radiation shield between adjacent ones of said heating elements in moving those certain segments between the retracted and extended positions.

81. In a system for processing a workpiece by applying a controlled heat thereto, a method comprising the steps of:

providing a heating arrangement including an array of spaced apart heating elements for use in a confronting relationship with said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement; and

configuring a segmented radiation shield including a plurality of segments supported for movement between (i) retracted positions, which allow said direct radiation to reach the workpiece, and (ii) extended positions, in which extended positions the plurality of segments cooperate in way which serves to block, at least in part, said direct radiation from reaching the workpiece and configured for moving at least certain ones of said segments of the radiation shield between adjacent ones of said heating elements in moving those certain segments between the retracted and extended positions.

82. In a system for processing a workpiece, having a treatment width, by applying controlled heat thereto, an apparatus comprising:

a heating arrangement for use in a confronting relationship with the treatment width of said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement;

a radiation shield supported for movement between (i) an open state to allow said direct radiation to reach the workpiece without producing shadowing thereon, and (ii) an extended state in which the radiation shield serves to block said direct radiation from reaching the workpiece such that the radiation shield moves a distance between the open state

and the extended state which is less than said treatment width; and

means for moving the radiation shield between the open state and the extended state.

83. In a system for processing a workpiece, having a treatment width, by applying controlled heat thereto, a method comprising:

providing a heating arrangement for use in a confronting relationship with the treatment width of said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement;

supporting a radiation shield for movement between (i) an open state to allow said direct radiation to reach the workpiece without producing shadowing thereon, and (ii) an extended state in which the radiation shield serves to block said direct radiation from reaching the workpiece such that the radiation shield moves a distance between the open state and the extended state which is less than said treatment width; and

moving the radiation shield between the open state and the extended state.

84. In a system for processing a workpiece, having a treatment width, by applying controlled heat thereto, an apparatus comprising:

a heating arrangement for use in a confronting relationship with the treatment width of said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement;

a radiation shield, including a plurality of members, supported for movement between (i) an open state to allow said direct radiation to reach the workpiece without producing shadowing thereon, and (ii) an extended state in which the radiation shield serves to block said direct radiation from reaching the workpiece such that each of said members moves a distance between the open state and the extended state which is less than said treatment width; and

means for moving the radiation shield between the open state and the extended state.

85. The apparatus of claim 84 wherein said heating arrangement includes an arrangement of heating elements and wherein said radiation shield includes a plurality of segments, as said plurality of members, which cooperate to at least partially block said direct radiation in said extended state and which retract at least between selected adjacent ones of said heating elements in moving to said open state.

86. In a system for processing a workpiece, having a treatment width, by applying controlled heat thereto, a method comprising:

providing a heating arrangement for use in a confronting relationship with the treatment width of said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement;

configuring a radiation shield to include a plurality of members, supported for movement between (i) an open state to allow said direct radiation to reach the workpiece without producing shadowing thereon, and (ii) an extended state in which the radiation shield serves to block said direct radiation from reaching the workpiece such that each of said members moves a distance between the open state and the extended state which is less than said treatment width; and

moving the radiation shield between the open state and the extended state.

87. The method of claim 86 wherein said heating arrangement is provided to include an arrangement of heating elements and wherein said radiation shield is configured including a plurality of segments, as said plurality of members,

which cooperate to at least partially block said direct radiation in said extended state and which retract at least between selected adjacent ones of said heating elements in moving to said open state.

88. In a system for processing a workpiece by applying controlled heat thereto, an apparatus comprising:

a heating arrangement for use in a confronting relationship with said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement, said heating arrangement including a plurality of spaced apart heating elements;

a radiation shield including a plurality of shield members that are supported for movement between (i) an open state to allow said direct radiation to reach the workpiece without producing shadowing thereon, and (ii) an extended state in which the shield members serve to at least partially block said direct radiation from reaching the workpiece such that the shield members move at least between adjacent ones of the heating elements; and

means for moving the shield members between the open state and the extended state.

89. In a system for processing a workpiece by applying controlled heat thereto, a method comprising:

providing a heating arrangement for use in a confronting relationship with said workpiece to subject the workpiece to a direct radiation that is produced by the heating arrangement, said heating arrangement including a plurality of spaced apart heating elements;

configuring a radiation shield to include a plurality of shield members that are supported for movement between (i) an open state to allow said direct radiation to reach the workpiece without producing shadowing thereon, and (ii) an extended state in which the shield members serve to at least partially block said direct radiation from reaching the workpiece such that the shield members move at least between adjacent ones of the heating elements; and

moving the shield members between the open state and the extended state.